



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,943	04/11/2005	Yoshinobu Suehiro	PTGF-04078US	2058
21254	7590	09/18/2006	EXAMINER	
MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC 8321 OLD COURTHOUSE ROAD SUITE 200 VIENNA, VA 22182-3817			MAKIYA, DAVID J	
			ART UNIT	PAPER NUMBER
			2875	

DATE MAILED: 09/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/521,943

Applicant(s)

SUEHIRO ET AL.

Examiner

David J. Makiya

Art Unit

2875

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/21/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 10-14, 17, 19-22, and 24-28 rejected under 35 U.S.C. 102(b) as being anticipated by Zhang (US Patent 6,578,998).

With respect to claim 1, Zhang teaches a light emitting apparatus, comprising a light source section 21 comprising a solid-state light emitting element (Column 1, Lines 47-49); a power supply section (31, 15) that supplies power to the light source section (Column 3, Lines 5-6, 41-50); a reflection section 11 that is disposed opposite to a light extraction surface of the light source section to reflect light emitted from the light source section (Figure 2); and a heat radiation section 31 that is disposed with a heat radiation width in a back direction of the light source section (Column 2, Lines 57-67).

With respect to claim 2, Zhang teaches a light emitting apparatus, comprising a light source section 21 comprising a solid-state light emitting element (Column 1, Lines 47-49); a power supply section (31, 15) that supplies power to the light source section (Column 3, Lines 5-6, 41-50); a reflection section 11 that is disposed opposite to a light extraction surface of the light source section to reflect light emitted from the light source section (Figure 2); a heat radiation section 31 that is disposed with a heat radiation width in a back direction of the light source section (Column 2, Lines 57-67); and a case 12 in which the reflection section and the radiation

section are placed and which externally radiates heat to be transferred from the heat radiation section (Column 3, Lines 13-21).

With respect to claim 3, Zhang teaches the light emitting apparatus wherein the heat radiation section comprises a same material as the case (Column 3, Lines 13-21).

With respect to claim 4, Zhang teaches the light emitting apparatus wherein the light source section is packaged 221 such that the solid-state light emitting element is sealed with a light transmitting material (Column 3, Lines 35-40).

With respect to claim 5, Zhang teaches the light emitting apparatus wherein the light source section is packaged 221 such that the solid-state light emitting element is sealed with a light transmitting material (Column 3, Lines 35-40).

With respect to claim 10, Zhang teaches the light emitting apparatus wherein the case comprises a high reflectivity surface to reflect the light (Column 3, Lines 13-21).

With respect to claim 11, Zhang teaches the light emitting apparatus wherein the case comprises a surface that is subjected to a finishing to increase its heat radiation area (Column 3, Lines 13-21 and Figure 4).

With respect to claim 12, Zhang teaches the light emitting apparatus wherein the heat radiation section comprises a heat radiation plate that comprises a high reflectivity surface to reflect the light (Column 3, Lines 13-21).

With respect to claim 13, Zhang teaches the light emitting apparatus wherein the heat radiation section comprises a heat radiation support 31 that comprises a high thermal conductivity material and transfers to the heat radiation section heat generated from the light

source section, and a heat radiation plate that transfers the heat through the heat radiation support (Column 3, Lines 62-67).

With respect to claim 14, Zhang teaches a light emitting apparatus, comprising a light source section 21 comprising a solid-state light emitting element (Column 1, Lines 47-49); a power supply section (31, 15) that supplies power to the light source section (Column 3, Lines 5-6, 41-50); a reflection section 11 that is disposed opposite to a light extraction surface of the light source section to reflect light emitted from the light source section (Figure 2); and a heat radiation section 31 that is disposed with a heat radiation width in a back direction of the light source section (Column 2, Lines 57-67), wherein the power supply section is formed with a width in the back direction of the light source section (Figure 2).

With respect to claim 17, Zhang teaches the light emitting apparatus wherein a spectrum light with a plurality of region wavelengths is radiated from the solid-state light emitting element or from the periphery of the solid-state light emitting element (Column 3, Lines 32-34).

With respect to claim 19, Zhang teaches the light emitting apparatus wherein the heat radiation section has the heat radiation width that is three times or more its thickness (Figure 1).

With respect to claim 20, Zhang teaches the light emitting apparatus wherein the light source section including the solid-state light emitting element has a width that is within five times that of the solid-state light emitting element (Figure 3).

With respect to claim 21, Zhang teaches the light emitting apparatus wherein the heat radiation section comprises a shape that protrudes toward a bottom of the reflection surface (Figure 2).

With respect to claim 22, Zhang teaches the light emitting apparatus wherein the reflection surface opposite to the light source section comprises a solid angle of 2π to 3.4π strad (Figure 2).

With respect to claim 24, Zhang teaches the light emitting apparatus wherein the reflection section does not comprise a resin section (Column 4, Lines 1-9). However, Zhang does state that using a resin section would be conventional, but in this case unnecessary to “simplify the process and reduce the manufacturing cost.”

With respect to claim 25, Zhang teaches the light emitting apparatus wherein the light source section comprises a plurality of solid-state light emitting elements (21', Figure 6).

With respect to claim 26, Zhang teaches the light emitting apparatus wherein the light emitting apparatus comprises a plurality of light source sections 21', and a plurality of reflection sections 13' and the heat radiation sections corresponding to the plurality of the light source sections (Figures 5 and 6).

With respect to claim 27, Zhang teaches the light emitting apparatus wherein the plurality of the light source sections generate a plurality of emission colors (Column 5, Lines 38-55).

With respect to claim 28, Zhang teaches the light emitting apparatus wherein the plurality of the light source sections generate emission colors of R, G, and B (Column 5, Lines 38-55).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang in view of Hecht (US Patent 6,871,993), Suehiro et al. (US 2002/0024808) and Bukosky (US Patent 6,076,948).

With respect to claim 6, Zhang teaches the device as described above wherein the light source section comprises the solid-state light emitting element that is flip-chip 21 (Figure 3) and the light source section is sealed 221 with a light transmitting material (Column 3, Lines 35-40). However, Zhang fails to teach the flip-chip being mounted on an inorganic material board on which a conductive pattern is formed, nor does it teach the type of material. Hecht teaches a light emitting apparatus comprising solid state light emitting element 16, a reflector 13, and a inorganic material board on which a conductive pattern is formed to supply power to the solid-state light emitting element (Column 2, Lines 39-45). Suehiro et al. teaches a light emitting apparatus wherein a "light emitting element is encapsulated with an encapsulating member made of an inorganic and light transmissive material such as epoxy resin and glass" (Paragraph 78). Bukosky et al. teaches a light emitting apparatus wherein a substrate 50 on which a light emitting diode 30 is located is also commonly made out of glass (Column 6, Lines 18-24). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light emitting apparatus to have a material board and seal material made of the same material, therefore having the same thermal expansion coefficient because "the substrate 26 provides a surface for supporting the LEDs 16 as well as means for providing drive current to the LEDs 16" (Hecht; Column 2, Lines 39-45) and glass is a commonly used inorganic material where "light from the light emitting element is emitted after the light is transmitted in the encapsulating member and is refracted on the surface" (Suehiro et al.; Paragraph 78).

Art Unit: 2875

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang in view of Hecht (US Patent 6,871,993), Suehiro et al. (US 2002/0024808) and Bukosky (US Patent 6,076,948) and further in view of Chen (US Patent 6,733,156)

With respect to claim 8, Zhang in view of Hecht, Suehiro et al. and Bukosky teaches the light emitting apparatus as described above but, it fails to teach bonding the element. Chen teaches the use of an epoxy resin 33 to protect and seal a LED chip 5 to a material board 2 (Column 2, Lines 41-62). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light emitting apparatus to have a material board seal the light emitting element while bonding in chemical reaction to the inorganic seal material because the "LED chip 5 is electrically connected" and also uses "a protection layer" (Chen; Column 2, Lines 39-44) to prevent damage.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang in view of Gorczyca (US Patent 6,800,373).

With respect to claim 9, Zhang teaches the light emitting apparatus wherein the solid-state light emitting element is sealed, but fails to teach the refractive index. Gorczyca teaches a light emitting diode 1 with a solid-state light emitting element 4 and a inorganic seal material 14 (Column 10, Lines 60-66) wherein the refractive index is 1.55 or more (Column 8, Line 65-Column 9, Line 9). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light emitting apparatus of Zhang with the teachings of Gorczyca because a high refractive index would "increase in the amount of emitting light...without significantly affecting the transparency of the epoxy encapsulant" (Gorczyca; Column 9, Lines 4-9).

Art Unit: 2875

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being obvious over Zhang in view of Chen.

With respect to claims 15 and 16, Zhang teaches the light emitting apparatus as described above where the power supply section comprises a metallic thin film disposed with a width in the back direction of the light source section and is integrated with the heat radiation section (Column 3, Lines 41-50). However, Zhang fails to teach the thin film insulated from the heat radiation section. Chen teaches the light emitting apparatus with a thin metallic film 3 sandwiched with insulators (1, 2; Column 2, Lines 50-60). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light emitting apparatus of Zhang with the teachings of Chen because “heat dissipation will be more efficient and the luminosity can be increased by a large amount, therefore, the light emitting efficiency will be higher” (Chen; Column 1, Lines 50-58).

Claim 18 is rejected under 35 U.S.C. 103(a) as being obvious over Zhang in view of Lowery (US Patent 5,959,316).

With respect to claim 18, Zhang teaches the light emitting apparatus as described above, but fails to teach a phosphor disposed on the periphery of the element. Lowery teaches a light emitting apparatus comprising a light emitting diode 18 and a phosphor 52 disposed on the periphery of the solid-state light emitting element. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light emitting apparatus of Zhang with the teachings of Lowery because “most of the blue light at 470 nm strikes the phosphors in the fluorescent material, and that light would be up-shifted such that the secondary green and red lights complement the residual blue light which escapes past the phosphors. This

Art Unit: 2875

provides a final combination of light which appears as white to the human eye” (Lowery; Column 1, Lines 21-27).

Claim 23 is rejected under 35 U.S.C. 103(a) as being obvious over Zhang in view of Camras et al. (US Patent 6,784,463).

With respect to claim 18, Zhang teaches the light emitting apparatus as described above, but fails to teach the light source with a turn-on power of 1 W or more. Camras et al. teaches a light emitting diode 100 with a turn-on power of 2.0 W. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the light emitting apparatus of Zhang with the teachings of Camras et al. because “the electrical power input to the devices may be further increased for larger active area devices. Consequently, the disclosed light-emitting devices may provide higher flux than conventional III-Phosphide and III-Arsenide light-emitting devices” (Camras et al.; Column 10, Lines 8-24).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Holder et al. (US Patent 7,001,047) and Schairer et al. (US Patent 5,472,915) teach light emitting diodes with heat sinks and reflectors.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to David J. Makiya whose telephone number is (571) 272-2273. The examiner can normally be reached on Monday-Friday 7:30am - 4:00pm (ET).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2875

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJM 09/08/2006



JOHN ANTHONY WARD
PRIMARY EXAMINER